

## University of Dundee

### Interventions for the well-being of healthcare workers during a pandemic or other crisis

Cairns, Patrick; Aitken, Gillian; Pope, Lindsey; Cecil, Joanne Elizabeth; Cunningham, Kathryn; Ferguson, Julie

*Published in:*  
BMJ Open

*DOI:*  
[10.1136/bmjopen-2020-047498](https://doi.org/10.1136/bmjopen-2020-047498)

*Publication date:*  
2021

*Licence:*  
CC BY-NC

*Document Version*  
Publisher's PDF, also known as Version of record

[Link to publication in Discovery Research Portal](#)

#### *Citation for published version (APA):*

Cairns, P., Aitken, G., Pope, L., Cecil, J. E., Cunningham, K., Ferguson, J., Gibson-Smith, K., Gordon, L., Peter, J., Laidlaw, A. H., Scanlan, G., Tooman, T., Wakeling, J., & Walker, K. A. (2021). Interventions for the well-being of healthcare workers during a pandemic or other crisis: Scoping Review. *BMJ Open*, 11(8), [e047498]. <https://doi.org/10.1136/bmjopen-2020-047498>

#### **General rights**








Copyright and moral rights for the publications made accessible in Discovery Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from Discovery Research Portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain.
- You may freely distribute the URL identifying the publication in the public portal.

#### **Take down policy**

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

# BMJ Open Interventions for the well-being of healthcare workers during a pandemic or other crisis: scoping review

Patrick Cairns <sup>1</sup>, Gill Aitken,<sup>2</sup> Lindsey Margaret Pope <sup>3</sup>, Joanne E Cecil <sup>1</sup>, Kathryn B Cunningham,<sup>1</sup> Julie Ferguson,<sup>4</sup> Katie Gibson Smith,<sup>5</sup> Lisi Gordon,<sup>6,7</sup> Peter Johnston <sup>5,8</sup>, Anita Laidlaw <sup>1</sup>, Gillian Marion Scanlan,<sup>6</sup> Tricia R Tooman <sup>1</sup>, Judy Wakeling,<sup>9</sup> Kim Walker <sup>5</sup>

**To cite:** Cairns P, Aitken G, Pope LM, *et al.* Interventions for the well-being of healthcare workers during a pandemic or other crisis: scoping review. *BMJ Open* 2021;**11**:e047498. doi:10.1136/bmjopen-2020-047498

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online. (<http://dx.doi.org/10.1136/bmjopen-2020-047498>).

Received 30 November 2020  
Accepted 03 August 2021



© Author(s) (or their employer(s)) 2021. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

For numbered affiliations see end of article.

## Correspondence to

Patrick Cairns;  
[pc74@st-andrews.ac.uk](mailto:pc74@st-andrews.ac.uk)

## ABSTRACT

**Objectives** The aim of this scoping review was to identify pre-existing interventions to support the well-being of healthcare workers during a pandemic or other crisis and to assess the quality of these interventions.

**Design** Arksey and O'Malley's five-stage scoping review framework was used to identify the types of evidence available in the field of well-being interventions for healthcare workers during a pandemic. PubMed, PsycINFO, Embase, Scopus, Web of Science, CINAHL and ERIC databases were searched to find interventions for the well-being of doctors during pandemics. Owing to a lack of results, this search was expanded to all healthcare workers and to include any crisis. Databases were searched in June 2020 and again in October 2020.

**Inclusion/exclusion criteria** Articles were included that studied healthcare workers, reported an intervention design and were specifically designed for use during a pandemic or other crisis. Well-being was defined broadly and could include psychological, physical, social or educational interventions.

**Results** Searching produced 10 529 total academic references of which 2062 were duplicates. This left 8467 references. Of these, 16 met our inclusion criteria and were included in data extraction. During data extraction, three more papers were excluded. This left 13 papers to summarise and report. Of these 13 papers, 6 were prospective studies and 7 were purely descriptive. None of the interventions were theoretically informed in their development and the quality of the evidence was generally deemed poor.

**Conclusions** There are no high-quality, theory-based interventions for the well-being of healthcare workers during a pandemic or other crisis. Given that previous pandemics have been shown to have a negative effect on healthcare workers well-being, it is imperative this shortcoming is addressed. This scoping review highlights the need for high-quality, theory-based and evidence-based interventions for the well-being of healthcare workers during a pandemic.

## INTRODUCTION

As the world grapples with the SARS-CoV-2 pandemic (hereafter COVID-19), healthcare systems and workers are placed under

## Strengths and limitations of this study

- This scoping review used a transparent methodological approach supported by the application of an established methodological framework.
- This review only included articles published in English, and well-being interventions for healthcare workers may exist in articles written in different languages.
- The searching was comprehensive, including seven academic bibliographic databases, three grey literature databases and one internet search engine.
- Our search terms were designed to be exhaustive but other search terms may exist that could produce further findings.
- A social media call was undertaken in an effort to further enhance the scope of the search.

increasing strain.<sup>1 2</sup> Teams are required to care for growing numbers of patients infected with a new and poorly understood disease. This work is often undertaken in challenging conditions and healthcare workers (HCWs) may consequently experience traumatic events.<sup>1 2</sup> During previous disease outbreaks, such as severe acute respiratory syndrome (SARS), HCWs experienced feelings of extreme vulnerability and uncertainty producing somatic and cognitive symptoms of anxiety.<sup>3 4</sup> Following the control of the SARS outbreak, depression and avoidance were evident among HCWs, with the prevalence of psychiatric morbidity estimated at approximately 75%.<sup>3 4</sup>

During the COVID-19 pandemic, HCWs internationally have experienced increased depressive symptoms, anxiety, psychological distress and poor sleep quality.<sup>3 4</sup> There is no determined definition for well-being, which can focus on multiple, different facets depending on the context and discipline. However, having identified that HCWs

are negatively affected both physically (exposure to COVID-19, sleep loss and exhaustion) and psychologically (anxiety, depression and distress) by the COVID-19 pandemic, it is important to identify measures to support these aspects of HCWs' well-being during this time. The occurrence of previous disease outbreaks such as SARS, Ebola and H1N1 led to expectations that previous interventions designed to support HCWs during a pandemic may exist within the academic literature.

However, it was expected that different healthcare professions would experience pandemics differently, have different needs, differing decision making, varying roles and responsibilities and therefore separate literature would exist for each group. Thus, the purpose of this scoping literature review was to identify the types of interventions previously utilised to support the well-being of doctors during pandemics existing within the literature.

Synthesising the literature in this way would provide a singular evidence base from which interventions can be judged as effective or ineffective in supporting the well-being of doctors. This would ensure that the most effective interventions are used and that they are targeted appropriately. For the interventions within the literature to be used in practice, they should be of high quality and theory-based.<sup>5</sup>

Therefore, our research question was 'What interventions currently exist that support the well-being of doctors during pandemics?'

## METHODS

### Study design

A scoping review methodology was chosen to provide an overview of the evidence rather than answering a specific question to inform policy or practice as is done in a systematic review.<sup>6</sup> Arksey and O'Malley's<sup>7</sup> methodological framework was followed for this scoping review by identifying the research question, identifying relevant studies, selecting these studies, charting the data and collating, summarising and reporting the results. The scoping review also carried out according to the 'Preferred Reporting Items for Systematic Reviews and Meta-Analyses for scoping reviews' guidelines.<sup>8</sup>

### Research question

Our initial research question was 'What interventions currently exist that support the well-being of doctors during pandemics?'

As the search progressed, it became evident that the existing literature relating to interventions for doctors during pandemics either did not exist or was very small. It was therefore decided to extend the study population to HCWs and look beyond pandemics to other crises.

Therefore, our final research question was 'What interventions currently exist that support the well-being of healthcare workers during pandemics or other crises?'

### Search strategy

The following databases were searched: PubMed, PsycINFO, Embase, Scopus, Web of Science, CINAHL

### Box 1 Search terms used for each data base.

((Epidemic\* OR Pandemic\* OR Human Influenza OR Disease Outbreaks OR Smallpox OR Dengue Virus OR Middle East Respiratory Syndrome Coronavirus OR HIV Infections OR Coronavirus Infections OR SARS-CoV-2.mp OR COVID-19.mp OR Porcine Respiratory Coronavirus OR Ebola Haemorrhagic Fever OR ebola.mp OR H1N1 OR "Swine flu" OR Viral Pneumonia OR disaster\* OR catastrophe OR crisis OR crises) AND ("health personnel" OR physician OR doctor\*) AND (Psychological Stress OR Physiological Stress OR Occupational Stress OR Psychological Burnout OR Professional Burnout OR Depression OR Health Promotion OR Self Care OR Mental Health OR Workload OR Suicide OR Fear OR Emotions OR Mental Health OR Post-Traumatic Stress Disorders OR Wounds and Injuries OR Dehydration OR Hunger OR Sleep))

and ERIC. This list includes all relevant databases that were selected to be as comprehensive as possible in our searching. No limits on date, country, subject or research type were placed on the database search, however only articles in English were considered during study selection.

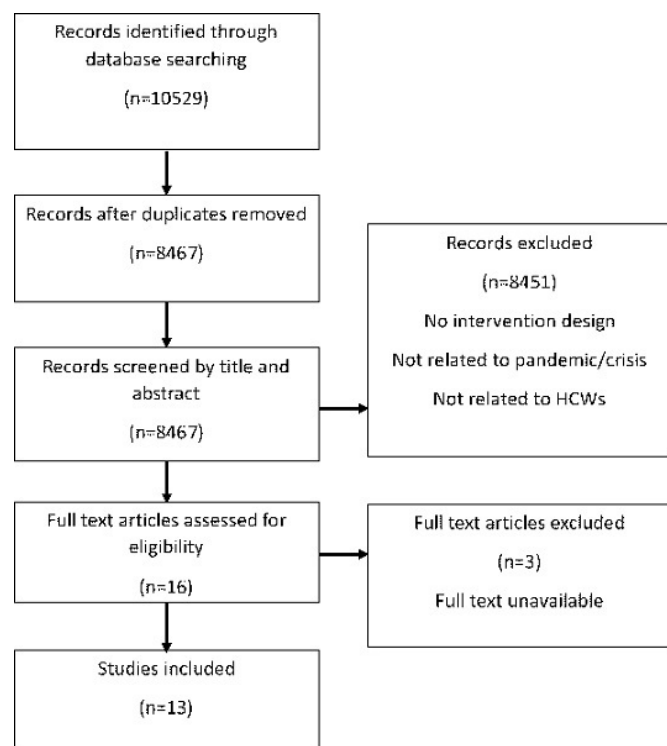
The grey literature was explored to evaluate evidence from books, conference reports, academic preprints and government reports. The following grey literature databases were searched: OpenGrey, WorldCat, Medrxiv and Advanced Google Search. Results from the Advanced Google Search were limited to .org websites and .PDF files in a bid to find reports from well-being or healthcare organisations. An appeal on social media (Twitter) was also made to contact relevant researchers and experts to request any literature on pre-existing interventions that had not been published in the academic literature.

Search terms were selected to maximise the possibility of finding relevant articles and were developed with the support of a librarian. Box 1 depicts the search terms used for each data base. For online precise search strategy see appendices.

The search of the seven academic databases and grey literature sources was conducted in June 2020 with a follow-up search in October 2020 to identify any additional interventions published since the original search.

### Charting the data

All citations were imported into bibliographic manager EndNote X9 (Clarivate Analytics, Philadelphia, PA, USA), and duplicate citations were removed. References were reviewed using their titles and abstracts, and full papers were reviewed when the relevance of the article was unclear. The included papers were then read in detail and a data capture form was developed and used to chart information including participants, type of intervention, theory used, quality assessment, outcome measures and results (see online supplemental appendix A for full data capture form). The data capture form was pretested prior to usage, and the data from a subsection of the included papers were extracted by three independent researchers.



**Figure 1** Preferred Reporting Items for Systematic Reviews and Meta-Analyses flowchart of academic study selection process.

Where papers adhered to established research types (eg, randomised controlled trials (RCTs) and prospective trials), quality assessment tools were used. Specifically, the National Institutes of Health Quality Assessment Tool for Before–After (Pre–Post) Studies With No Control Group was used for studies measuring effectiveness.<sup>9</sup> Resources obtained from Twitter were collated separately and assessed the following: name, web link, country, intended audience, theory, issues address and status (see online supplemental appendix B).

### Study selection

Studies were excluded if they did not include HCWs, involve an intervention, or relate to pandemics or other crises. Searching the seven academic databases produced a total of 10 529 references. Of these, 2062 were duplicates. This left 8467 references. Of these, 16 papers fitting the inclusion criteria were chosen for data extraction. During data extraction, three more papers were excluded as the full text article was not available. This left 13 papers to synthesise, summarise and report (figure 1).

The grey literature contained 2325 total references, none of which were chosen for data extraction since they did not meet inclusion criteria.

## RESULTS

### Types of publications found

Of the 13 publications discovered from academic databases, none were RCTs. The 13 publications included 6 prospective studies<sup>10–15</sup> and 7 descriptive studies<sup>16–22</sup>

resembling protocols. The general quality of the studies therefore ranged from poor to fair according to the hierarchy of scientific evidence.<sup>23</sup> The studies were published between 2006 and 2020 and were conducted in Canada, China, France, Japan, Philippines, Taiwan, UK and USA (see tables 1 and 2).

### Prospective studies

Details of the six prospective studies<sup>10–15</sup> are provided in box 1. All interventions targeted psychological well-being.<sup>10–15</sup> Four interventions targeted the psychological well-being of HCWs in general,<sup>10 11 13 14</sup> one focused on the well-being of nurses<sup>11</sup> and one focused on the well-being of disaster mental health workers.<sup>15</sup> The contents of these interventions included education provision,<sup>10 11</sup> environmental restructuring,<sup>12</sup> meditation<sup>13 15</sup> or a mixture of education and meditation.<sup>14</sup> One study assessed acceptability of the intervention<sup>11</sup> and five measured intervention effectiveness.<sup>10 12–15</sup> Outcome measures included Likert scales of the authors own creation<sup>10 11 13</sup> or a broad range of anxiety, depression, mood and sleep scales.<sup>12 13 15</sup>

All interventions reported positive outcomes,<sup>10–15</sup> including participants feeling better able to cope and more prepared to deal with a pandemic,<sup>10</sup> improved anxiety and reduced depression,<sup>12–15</sup> reduced PTSD<sup>14</sup> and a perception of usefulness and acceptability.<sup>11</sup>

None of the six prospective studies included a control group.<sup>10–15</sup> Five of these studies<sup>10 12–15</sup> were rated as poor quality for the following reasons: poor outcome measures, lack of blinding, no description of attrition and not using an interrupted time series design (multiple measurements before and after intervention).

One study measuring the acceptability of a well-being intervention<sup>11</sup> was appraised as high quality due to clearly stating the aims and objectives, a clearly specified and appropriate research design for the aims and objectives of the research, a clear account of the process by which their findings were found, displaying enough data to support their interpretations and conclusions and the method of analysis being appropriate and adequately explained.<sup>9</sup>

None of the six prospective studies reported used theory in their approach to designing the intervention.<sup>10–15</sup> One study<sup>12</sup> mentioned theory in its interpretation of the data and related it to nurses adopting coping mechanisms as a response to crises<sup>24</sup> (see table 1).

### Descriptive studies

Details of the seven descriptive studies<sup>16–22</sup> are provided in table 2. Six were related to the COVID-19 pandemic<sup>16–18 20–22</sup> and one was related to a nuclear disaster.<sup>19</sup> All interventions targeted psychological well-being. Six interventions targeted the psychological well-being of HCWs,<sup>16–18 20–22</sup> and one studied disaster recovery support staff.<sup>19</sup> The contents of these interventions included social support,<sup>16</sup> provision of psychological support,<sup>17 19</sup> signposting to psychological support<sup>18 20 22</sup> and a mixture of physical and psychological support.<sup>21</sup> None of these studies<sup>16–22</sup> included outcome measures or provided any analysis.



**Table 1** Description of six prospective studies included in scoping review following the literature search

Author	Year	Country	Participants	Participant N	Context	Specific	Type	Structure	Theory mentioned? Y/N	Outcome measures
Aiello <i>et al</i> <sup>10</sup>	2011	Canada	HCWs	1250	Pandemic	H1N1	Psychological	One-hour educational session	N	Eight Likert scale questions, one question beforehand
Blake <i>et al</i> <sup>11</sup>	2020	UK	HCWs	55	Pandemic	COVID-19	Psychological	A digital learning package	N	Likert scales. Assessment of fidelity, acceptability, usability and utility
Chen <i>et al</i> <sup>12</sup>	2006	Taiwan	Nurses	116	Pandemic	SARS	Psychological	In-service training, manpower allocation, gathering sufficient protective equipment and establishment of a mental health team	N	Zung's Self-rating Anxiety Scale. Zung's Self-rating Depression Scale. Pittsburgh Sleep Quality Index
Iwakuma <i>et al</i> <sup>13</sup>	2017	Japan	HCWs	17	Natural disaster	Great East Japan Earthquake	Psychological	45 min guided meditation followed by reflection session	Y – coping mechanisms	Depression, anger, fatigue, vigour, strain and confusion using Temporary Mood Scale
Ke <i>et al</i> <sup>14</sup>	2017	Taiwan	HCWs	67	Natural disaster	Earthquake	Psychological	On-site debriefing courses and mini-lectures, physical therapy and mental relaxation programme, debriefing	N	Own Post-traumatic Stress Disorder (PTSD) measure, own resilience measure (recovery from reported symptoms)
Waelde <i>et al</i> <sup>15</sup>	2018	Philippines	Disaster mental health workers	68	Natural disaster	Typhoon Haiyan	Psychological	A 4-hour mindfulness workshop followed by an 8-week home study programme	N	Perceived usefulness of training, daily practice, training expectancies, disaster exposure, depression (Centre for Epidemiological Studies for Epidemiological Studies - Depression Scale), anxiety, PTSD (both single questions)

HCWs, health care workers.

**Table 2** Description of seven descriptive studies included in scoping review following literature search

Author	Year	Country	Participant			Context	Specific	Structure	Theory mentioned? Y/N	Outcome measures
			N	Participants	N					
Albott <i>et al</i> <sup>16</sup>	2020	USA	0	HCWs	0	Pandemic	COVID-19	Peer support 2–3 times per week, weekly 'drop-in' huddle	N	None
Cheng <i>et al</i> <sup>17</sup>	2020	China, USA	0	HCWs	0	Pandemic	COVID-19	Discussion on self-care, mindfulness and relaxation, active listening and empathy, music therapy	Y – Kubler Ross stages of grief	None
Geoffroy <i>et al</i> <sup>18</sup>	2020	France	149	HCWs	149	Pandemic	COVID-19	Hotline for psychological support	N	Number of calls, call length, caller gender, caller age, reasons for calling.
Kawazoe <i>et al</i> <sup>19</sup>	2019	Japan	19	Disaster recovery support staff	19	Nuclear disaster	Accident at Fukushima Daiichi Nuclear Power Plant	3 hours of mental health seminars and individual counselling.	N	None
Matthewson <i>et al</i> <sup>20</sup>	2020	UK	362	HCWs	362	Pandemic	COVID-19	Telephone support line	N	Number of calls, reasons for calling, change over time.
Ripp <i>et al</i> <sup>21</sup>	2020	USA	0	HCWs	0	Pandemic	COVID-19	PPE. Free transport, childcare, housing, food. Daily communication, weekly virtual town halls. Resilience and self-care, group debrief, individual brief, long-term mental health support, crisis management	N	None
Zhang <i>et al</i> <sup>22</sup>	2020	China	0	HCWs	0	Pandemic	COVID-19	Internet platforms to carry out psychological intervention	N	None

HCWs, health careworkers.

As these seven descriptive studies either did not include outcome measures<sup>15 16 18 20 21</sup> or statistical analysis,<sup>17 19</sup> no quality assessment tool was used.

None of the seven descriptive studies mentioned used theory in their approach to designing the intervention.<sup>16–22</sup> One study<sup>16</sup> mentioned theory in its discussion of their intervention, suggesting that HCWs may go through Kubler-Ross's<sup>25</sup> seven stages of grief during and after the pandemic. No evidence is provided to support this claim (see table 2).

## DISCUSSION

The primary finding from this scoping review is that no published evidence base exists regarding interventions for the well-being of doctors during pandemics and limited literature exists concerning the well-being of HCWs in general during crises. This limited evidence includes no RCTs, six prospective trials and seven descriptive studies published between 2006 and 2020. Of these prospective trials, all, with the exception of one,<sup>11</sup> were deemed to be of poor quality. Blake *et al*<sup>11</sup> assessed fidelity, acceptability, usability and utility. Thus, it has not been proven to be effective in positively influencing the psychological well-being of HCWs. The seven descriptive studies did not include statistical analyses. Furthermore, although two studies mentioned theory to interpret their results,<sup>13 17</sup> none of the included studies<sup>10–22</sup> reported using theory to develop their interventions and therefore are not considered theory-based.<sup>26</sup> Within the grey literature, although resources for the well-being of HCWs were available, the majority did not have peer-reviewed publications to support their use and were not designed specifically for use in a pandemic.

The strengths of this scoping review include utilisation of a transparent methodological approach supported by the application of an established methodological framework.<sup>7</sup> Our use of a bibliographic manager (EndNote) meant all citations and articles were properly accounted for during the process. The literature search was comprehensive, and included seven academic bibliographic databases, three grey literature databases and one internet search engine. We adopted Medical Subject Headings in an effort to enhance the depth and accuracy of our searches. The data capture forms were pretested by all reviewers and revised prior to implementation. Finally, we attempted to contact relevant researchers via social media to uncover relevant literature. The limitations of this scoping review were that it only included articles published in English and as such, may have omitted well-being interventions developed for HCWs in other languages. Our search terms were designed to be exhaustive, but other search terms may exist that could produce further findings. Furthermore, although a grey literature search was undertaken there may be interventions used in practice or in local contexts that are effective but have not been published and so are unidentifiable.

The fact that no high-quality, theory-based interventions exist is problematic. Pandemics are crisis moments and time sensitive, demanding the majority of HCWs' time and attention. However, occurrences of infectious diseases are increasing, something that has been known for over a decade,<sup>27</sup> and the negative effect of these outbreaks on HCW well-being has been known for still longer.<sup>3 4</sup> The importance of evidence for high-quality interventions that support HCW well-being cannot be overemphasised and represents a significant gap in the literature.

In light of the lack of available evidence, it is not possible to give recommendations regarding interventions for the well-being of HCWs during a pandemic or other crisis. However, recommendations can be given regarding the direction of future research into this topic. Well-being interventions are complex, and their development should be supported by the use of theory, as recommended by the General Medical Council.<sup>5</sup> For example, incorporating the Behaviour Change Wheel<sup>28</sup> and Behaviour Change Taxonomy<sup>29</sup> would characterise key mechanisms of an intervention which contribute to its success or failure. Examples of these could include adding objects to the environment such as well-being resources, providing social support such as an online group therapy session or the modelling of behaviours including instruction on how to perform a behaviour such as accessing support.<sup>29</sup> Identifying mechanisms of action ensures that interventions are replicable and that active ingredients of these interventions are accurately pinpointed.

## CONCLUSION

Thirteen interventions were found relating to interventions for the well-being of HCWs during a crisis. However, these were prospective and descriptive studies and were generally judged to be of poor quality during quality assessment. This scoping review highlights the need for high-quality, theory-based interventions for the well-being of HCWs during a pandemic.

### Author affiliations

<sup>1</sup>School of Medicine, University of St Andrews, St Andrews, UK

<sup>2</sup>Centre for Medical Education, The University of Edinburgh, Edinburgh, UK

<sup>3</sup>General Practice and Primary Care, University of Glasgow, Glasgow, UK

<sup>4</sup>NHS Education for Scotland, Glasgow, UK

<sup>5</sup>Centre for Healthcare Education Research and Innovation, University of Aberdeen, Aberdeen, UK

<sup>6</sup>Centre for Medical Education, University of Dundee, Dundee, UK

<sup>7</sup>Monash Centre for the Scholarship in Health Education, Monash University, Clayton, Victoria, Australia

<sup>8</sup>NHS Education for Scotland, Aberdeen, UK

<sup>9</sup>NHS Education for Scotland, Edinburgh, UK

**Twitter** Patrick Cairns @kernzi, Lindsey Margaret Pope @LindseyMPope, Katie Gibson Smith @kgibsonsmith7, Lisi Gordon @lisigordon, Gillian Marion Scanlan @gillianmscanlan, Tricia R Tooman @trtooman and Kim Walker @DrkimMeded

**Acknowledgements** The authors thank Vicki Cormie, librarian at University of St Andrews, for advice on conducting scoping reviews.

**Contributors** This study was part of a larger research project 'To develop evidence-based interventions to support doctors' wellbeing and promote resilience

during COVID-19 (and beyond)', for which KW as principal investigators and PJ, LMP, GA, LG, KGS, AL, JEC and GMS as co-investigators conceived the work. PC, TRT and KBC were involved with the design of the work. PC prepared the original draft of the paper and GA, LMP, JF, GMS, TRT, LG, AL, JEC, KBC, KGS, PJ, JW and KW contributed to the refinement of the paper. All authors have read and approved the final paper and agree to be accountable for all aspects of the work. This study is guaranteed by the University of Aberdeen.

**Funding** This study was supported by Chief Scientist Office of Scotland, grant number COV/ABN/20/06.

**Competing interests** None declared.

**Patient consent for publication** Not required.

**Ethics approval** Ethical approval for this study was not required as it was a review and no participants were involved.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** Data sharing not applicable as no datasets generated and/or analysed for this study.

**Supplemental material** This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

**Open access** This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

## ORCID iDs

Patrick Cairns <http://orcid.org/0000-0002-8480-8386>  
Lindsey Margaret Pope <http://orcid.org/0000-0003-0899-9616>  
Joanne E Cecil <http://orcid.org/0000-0003-4779-6037>  
Peter Johnston <http://orcid.org/0000-0002-9446-8354>  
Anita Laidlaw <http://orcid.org/0000-0003-1214-4100>  
Tricia R Tootan <http://orcid.org/0000-0002-1227-2033>  
Kim Walker <http://orcid.org/0000-0001-8873-2270>

## REFERENCES

- Vindegard N, Benros ME. COVID-19 pandemic and mental health consequences: systematic review of the current evidence. *Brain Behav Immun* 2020;89:531–42.
- Luo M, Guo L, Yu M, et al. The psychological and mental impact of coronavirus disease 2019 (COVID-19) on medical staff and general public - A systematic review and meta-analysis. *Psychiatry Res* 2020;291:113190.
- Chong M-Y, Wang W-C, Hsieh W-C, et al. Psychological impact of severe acute respiratory syndrome on health workers in a tertiary hospital. *Br J Psychiatry* 2004;185:127–33.
- Maunder RG, Lancee WJ, Balderson KE, et al. Long-term psychological and occupational effects of providing Hospital healthcare during SARS outbreak. *Emerg Infect Dis* 2006;12:1924–32.
- Craig P, Dieppe P, Macintyre S, et al. Developing and evaluating complex interventions: the new medical Research Council guidance. *BMJ* 2008;337:a1655.
- Munn Z, Peters MDJ, Stern C, et al. Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMJ Med Res Methodol* 2018;18:143.
- Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol* 2005;8:19–32.
- Tricco AC, Lillie E, Zarin W, et al. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. *Ann Intern Med* 2018;169:467–73.
- NIH, National Heart, Lung and Blood Institute. Quality assessment tool for before-after (pre-post) studies with no control group, 2014. Available: <https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools>
- Aiello A, Khayeri MY-E, Raja S, et al. Resilience training for hospital workers in anticipation of an influenza pandemic. *J Contin Educ Health Prof* 2011;31:15–20.
- Blake H, Bermingham F, Johnson G, et al. Mitigating the psychological impact of COVID-19 on healthcare workers: a digital learning package. *Int J Environ Res Public Health* 2020;17:2997.
- Chen R, Chou K-R, Huang Y-J, et al. Effects of a SARS prevention programme in Taiwan on nursing staff's anxiety, depression and sleep quality: a longitudinal survey. *Int J Nurs Stud* 2006;43:215–25.
- Iwakuma M, Oshita D, Yamamoto A, et al. Effects of breathing-based meditation on earthquake-affected health professionals. *Holist Nurs Pract* 2017;31:177–82.
- Ke Y-T, Chen H-C, Lin C-H, et al. Posttraumatic psychiatric disorders and resilience in healthcare providers following a disastrous earthquake: an interventional study in Taiwan. *Biomed Res Int* 2017;2017:1–7.
- Waelde LC, Hechanova MRM, Ramos PAP, et al. Mindfulness and MANTRA training for disaster mental health workers in the Philippines. *Mindfulness* 2018;9:1181–90.
- Albott CS, Wozniak JR, McGlinch BP, et al. Battle buddies: rapid deployment of a psychological resilience intervention for health care workers during the COVID-19 pandemic. *Anesth Analg* 2020;131:43–54.
- Cheng P, Xia G, Pang P, et al. COVID-19 epidemic peer support and crisis intervention via social media. *Community Ment Health J* 2020;56:786–92.
- Geoffroy PA, Le Goanvic L, V, Sabbagh O, et al. Psychological support system for hospital workers during the Covid-19 outbreak: rapid design and implementation of the Covid-Psy Hotline. *Front Psychiatry* 2020;11:511.
- Kawazoe I, Kidachi R, Norikane K, et al. Stress management for disaster recovery support staff assisting nuclear disaster evacuees. *Radiat Prot Dosimetry* 2019;184:547–9.
- Matthewson J, Tiplady A, Gerakios F, et al. Implementation and analysis of a telephone support service during COVID-19. *Occup Med* 2020;70:375–81.
- Ripp J, Peccoralo L, Charney D. Attending to the emotional well-being of the health care workforce in a New York City health system during the COVID-19 pandemic. *Acad Med* 2020;95:1136–9.
- Zhang J, Wu W, Zhao X, et al. Recommended psychological crisis intervention response to the 2019 novel coronavirus pneumonia outbreak in China: a model of West China Hospital. *Precis Clin Med* 2020;3:3–8.
- Evans D. Hierarchy of evidence: a framework for ranking evidence evaluating healthcare interventions. *J Clin Nurs* 2003;12:77–84.
- Aguilera DC. *Crisis intervention: theory and methodology*. 6th edn. St. Louis: Mosby, 1994.
- Kubler-Ross E. *On death and dying*. New York: Macmillan Publishing, 1969.
- Michie S, Prestwich A. Are interventions theory-based? Development of a theory coding scheme. *Health Psychol* 2010;29:1–8.
- Jones KE, Patel NG, Levy MA, et al. Global trends in emerging infectious diseases. *Nature* 2008;451:990–3.
- Michie S, Richardson M, Johnston M, et al. The behavior change technique taxonomy (V1) of 93 hierarchically clustered techniques: building an international consensus for the reporting of behavior change interventions. *Ann Behav Med* 2013;46:81–95.
- Michie S, van Stralen MM, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implement Sci* 2011;6:42.



**Precise search strategy for OVID MEDLINE which contains PubMed**

Table A1. Exact MeSH, Boolean Search Terms

((Epidemic* OR Pandemic* OR Human Influenza OR Disease Outbreaks OR Smallpox OR Dengue Virus OR Middle East Respiratory Syndrome Coronavirus OR HIV Infections OR Coronavirus Infections OR SARS-CoV-2.mp OR COVID-19.mp OR Porcine Respiratory Coronavirus OR Ebola Haemorrhagic Fever OR ebola.mp OR H1N1 OR "Swine flu" OR Viral Pneumonia OR disaster* OR catastrophe OR crisis OR crises)
AND
("health personnel" OR physician OR doctor*)
AND
(Psychological Stress OR Physiological Stress OR Occupational Stress OR Psychological Burnout OR Professional Burnout OR Depression OR Health Promotion OR Self Care OR Mental Health OR Workload OR Suicide OR Fear OR Emotions OR Mental Health OR Post-Traumatic Stress Disorders OR Wounds and Injuries OR Dehydration OR Hunger OR Sleep))

No limits or filters were added for the searches. Therefore the whole database from 1946 to October 2020 was searched.

	Author(s)	Journal	Country	Year of	Format	e.g. Type of work	e.g. RCT?	Participants (c)	Participants	Context (Pan specific cor	Type of interven	Intervention content	Intervention struct	Aims of st	Outcome measures	Important results	Conclusion	Conclusion Notes	Quality	Theory included? Y/N	Which theory?	Acceptability measure	Research type	Further Notes	
Resilience training for hospital workers in anticipation of an influenza pandemic	Aiello	Journal of Continuing Education in the Health Professions	Canada	2011	Paper	Original research	N	Hospital staff	1250	Pandemic	H1N1	Psychological	An introduction to the pr	One one-hour sess	To build r	8 Likert scale question	The proportion of p	Our result: Results an Little desc	N		Y		prospective	effectiveness	
Battle Buddies: Rapid Deployment of a Psychological Resilience Intervention for Healthcare Worker	Albott	Anesthesia and Analgesia	USA	2020	Paper	Original research	N	HCWs	0	Pandemic	COVID-19	Psychological	(1) A peer support Battle	Ongoing, Battle Bu	1. To supp	Not yet decided	N/A	Level 1 of the prograi	No proof t	N		N	descriptive, protocol		
Mitigating the Psychological Impact of COVID-19 on Healthcare Workers: A Digital Learning Package	Blake	International Journal of Environmental Research and Public Health	UK	2020	Paper	Original research	N	HCWs	55	Pandemic	COVID-19	Psychological	The package outlines the A	Digital Learning T	The aim o	Likert scales. Evaluate	Evaluation demon	Overall, It's No RCT. Need mor	N		Y		prospective	acceptability	
Improving resistance and resiliency through crisis intervention training	Chan	International Journal of Emergency Mental Health		2012	Paper	Original research																			
Effects of a SARS prevention programme in Taiwan on nursing staff's anxiety, depression and sleep	Chen	International Journal of Nursing Studies	Taiwan	2006	Paper	Original research	N	Nurses	116	Pandemic	SARS	Psychological	CI This plan was based on information provided byWHO a	Zung's self-rating	anxi	Anxiety: The	anxiety	The preve	Before and after mea	Y		Coping strategies	N	prospective	effectiveness
COVID-19 Epidemic: Peer Support and Crisis Intervention Via Social Media	Cheng	Community Mental Health Journal	China, US	2020	Paper	Original research	N	HCWs	0	Pandemic	COVID-19	Social	Talks on self-care, mindfr	short term peer su	Provide pe	None	None	Use Stages	No scient	Interesting	Y			post-hoc theory in discussion	
Psychological Support System for Hospital Workers During the Covid-19 Outbreak: Rapid Design and Geoffrey		Frontiers in Psychiatry	France	2020	Paper	Original research	N	Hospital worke	149	Pandemic	COVID-19	Psychological	Hotline for psychological	We built a hotline	To rapidly	Number of calls, call	16 days, we received	This psych	No measu	Descriptiv	N		N	descriptive, protocol	
Effects of Breathing-Based Meditation on Earthquake-Affected Health Professionals	Iwakuma	Holistic Nursing Practice	Japan	2017	Paper	Original research	N	HCWs	17	Natural disa	Great East J	Psychological	Breathing-based Meditat	45-minute guided i	The prese	Depression, anger, fat	participants were	Following	Yes althou	Small sam	N		N	prospective	effectiveness
Stress Management for Disaster Recovery Support Staff Assisting Nuclear Disaster Evacuees	Kawazoe	Radiation Protection Dosimetry	Japan	2019	Paper	Original research	N	Disaster recove	19	Nuclear disa	Accident of Fukushima Daiichi Nuclear Power Plant	Mental health sem	This study	Coping Inventory for S	None related to intr	None relat	N/A	Note that	N		N	descriptive, protocol			
Posttraumatic Psychiatric Disorders and Resilience in Healthcare Providers following a Disastrous Ea	Ke	BioMed Research International	Taiwan	2017	Paper	Original research	N	HCWs	67	Natural disa	Earthquake	Psychological	Psychological support, in	On-site debriefing: See	preval	Own PTSD measure, o	16.4% PTSD immedi	This prosp	Using own	Decent stu	N		N	prospective	effectiveness
Implementation and analysis of a telephone support service during COVID-19	Matthewson	Occupational Medicine	UK	2020	Paper	Original research	N	HCWs	362	Pandemic	COVID-19	Psychological	Clarification of guidance. The rapid impleme	To describ	Number of calls, reaso	56 hundred and fift	Clear and	The imple	No cost-bu	N			N	descriptive, protocol	no evaluative measures
Stress management and resiliency training for health-care professionals	Mehta	Global Advances in Health and Medicine		2018	Paper	Original research																			
Attending to the Emotional Well-Being of the Health Care Workforce in a New York City Health Syst	Ripp	Journal of the Association of American Medical Colleges	USA	2020	Paper	Original research	N	HCWs	0	Pandemic	COVID-19	Psychological	Meeting basic daily need	Tracking PPE, free i	Attending	None	None	N/A	No measu	N		N	descriptive, protocol	no evaluative measures	
The MINDtoSTRONG intervention for New Nurse Residents: 6-Month Effects on Mental Health	Campson	Worldviews on evidence-based nursing	USA	2020	Paper	Original research	Y	New Nurse Res	89	No event	No event	Psychological	Ph a cognitive behavioral sk	EGRE	30-35 min we	This study	Perceived stress, anxi	The intervention gr	The MIND	Anxiety gr	not in par	Y			not in data
Mindfulness and mantra training for disaster mental health workers in the Philippines	Waeide	Mindfulness	Philippine	2018	Paper	Original research	N	Disaster menta	68	Natural disa	Typhoon H	Psychological	a manualized mindfulness	A 4-h workshop co	This study	Perceived usefulness c	following the work	Participant	No eviden	Measures	N		N	prospective	perceived usefulness not acceptability
Recommended psychological crisis intervention response to the 2019 novel coronavirus pneumonia	Zhang	Precision Clinical Medicine	China	2020	Paper	Original research	N	HCWs	0	Pandemic	COVID-19	Psychological	A model that integrates j	General	Provide pe	emotional and stress j	None reported	None	No structu	Y		Emotion hypothe	N	descriptive, protocol	Created own theoretical model, no testing of model.
prospective																									
descriptive, protocol																									
Resilience training for hospital workers in anticipation of an influenza pandemic	Aiello																								
Mitigating the Psychological Impact of COVID-19 on Healthcare Workers: A Digital Learning Package	Blake																								
Effects of a SARS prevention programme in Taiwan on nursing staff's anxiety, depression and sleep	Chen																								
Effects of Breathing-Based Meditation on Earthquake-Affected Health Professionals	Iwakuma																								
Posttraumatic Psychiatric Disorders and Resilience in Healthcare Providers following a Disastrous Ea	Ke																								
Mindfulness and mantra training for disaster mental health workers in the Philippines	Waeide																								
Battle Buddies: Rapid Deployment of a Psychological Resilience Intervention for Healthcare Worker	Albott																								
COVID-19 Epidemic: Peer Support and Crisis Intervention Via Social Media	Cheng																								
Psychological Support System for Hospital Workers During the Covid-19 Outbreak: Rapid Design and Geoffrey																									
Stress Management for Disaster Recovery Support Staff Assisting Nuclear Disaster Evacuees	Kawazoe																								
Implementation and analysis of a telephone support service during COVID-19	Matthewson																								
Attending to the Emotional Well-Being of the Health Care Workforce in a New York City Health Syst	Ripp																								
Recommended psychological crisis intervention response to the 2019 novel coronavirus pneumonia	Zhang																								

Name	Link	Country	Audience	Theory	Issues addressed	Status	Based on specific academic paper?
Pandemic Kindness Movement	<a href="https://aci.health.nsw.gov.au/covid-19/kindness">https://aci.health.nsw.gov.au/covid-19/kindness</a>	Australia	Health workers	Maslow's hierarchy of needs	Physical, psychological, social, system	List of resources	N
Covid trauma response working group	<a href="https://www.traumagroup.org/">https://www.traumagroup.org/</a>	England	Health workers	Trauma-informed	Psychological	On-going research	N
WHO Mental health and psychosocial considerations during the COVID-19 outbreak	<a href="https://www.who.int/docs/default-source/coronaviruse/mental-health-considerations.pdf?sfvrsn=6d3578af_2">https://www.who.int/docs/default-source/coronaviruse/mental-health-considerations.pdf?sfvrsn=6d3578af_2</a>	International	All	None	Physical, psychological, social, system	Guidelines	N
Samaritans helpline	<a href="https://www.samaritans.org/scotland/how-we-can-help/health-and-care/here-listen-support-line-nhs-people/">https://www.samaritans.org/scotland/how-we-can-help/health-and-care/here-listen-support-line-nhs-people/</a>	UK	Health and social care workers	None	Psychological	Confidential support line	N
NHS Day A Virtual Conference on Stress Resistance & Resilience in Challenging Times	<a href="https://the.3pconference.live/nhsday/">https://the.3pconference.live/nhsday/</a>	UK	Health workers	Broad	Psychological	Educational	N
Dramatherapy	<a href="https://www.royahamiddramatherapy.co.uk/supervision">https://www.royahamiddramatherapy.co.uk/supervision</a>	UK	All	Unsure	Psychological	Paid Therapy	N
Tend Academy	<a href="https://www.tendacademy.ca/">https://www.tendacademy.ca/</a>	US	All	Unsure	Psychological	Paid Online courses	N
First You: Caring for those who care for us	<a href="https://firstyou.org/">https://firstyou.org/</a>	UK	Health workers	Grief, trauma	Psychological	Multiformat resources	N
Circle Up for COVID-19	<a href="https://harvardmedsim.org/circle-up-for-covid-19/">https://harvardmedsim.org/circle-up-for-covid-19/</a>	US	Health workers	None	Psychological	Procedure	N
Psychological Wellbeing for Healthcare Workers	<a href="https://www.nottingham.ac.uk/toolkits/play_22794#resume=13">https://www.nottingham.ac.uk/toolkits/play_22794#resume=13</a>	UK	Health workers	None	Psychological	Toolkit	N
Narrative Healthcare Story-Informed Care for Humans	<a href="https://narrativehealthcare.net/">https://narrativehealthcare.net/</a>	US	Health workers	None	Psychological	Resources	N
The Re-Humanising Revolution	<a href="https://re-humanising.co.uk/category/the-covid-diaries/">https://re-humanising.co.uk/category/the-covid-diaries/</a>	Unsure	All	None	Psychological	Stories	N
NHS Practitioner Health Support Services & Access to Therapy	<a href="https://www.practitionerhealth.nhs.uk/support-services-access-to-therapy">https://www.practitionerhealth.nhs.uk/support-services-access-to-therapy</a>	UK	Health workers	None	Psychological and practical support	List of resources	N
Safe Space Health - Safety, Connection, Fulfilment.	<a href="https://safespace.health/">https://safespace.health/</a>	UK	Health workers	None	Psychological - Health coaching	App and workshops	N
Future Learn - Psychological First Aid in emergencies training for frontline staff and volunteers	<a href="https://www.futurelearn.com/info/press-releases/psychological-first-aid-in-emergencies-training-for-frontline-staff-and-volunteers">https://www.futurelearn.com/info/press-releases/psychological-first-aid-in-emergencies-training-for-frontline-staff-and-volunteers</a>	UK	Health workers	None	Psychological	Free online training from PHE	N
Support The Workers	<a href="https://www.supporttheworkers.org/">https://www.supporttheworkers.org/</a>	UK	Health workers	None	Physical, psychological, social, system	One page briefs	N
The psychological needs of healthcare staff as a result of the Coronavirus pandemic	<a href="https://www.bps.org.uk/sites/www.bps.org.uk/files/News/News%20-%20Files/Psychological%20needs%20of%20healthcare%20staff.pdf">https://www.bps.org.uk/sites/www.bps.org.uk/files/News/News%20-%20Files/Psychological%20needs%20of%20healthcare%20staff.pdf</a>	UK	Health workers	Maslow's hierarchy of needs	Physical, psychological, social, system	Guidance	N
BMA Your Wellbeing	<a href="https://www.bma.org.uk/advice-and-support/your-wellbeing">https://www.bma.org.uk/advice-and-support/your-wellbeing</a>	UK	Doctors and medical students	None	Physical, psychological	Counselling, questionnaires, information	N